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Assessment of Factors Affecting Growth of Indigenous Poultry Value Chain in Kathiani Sub-County, Machakos County, Kenya

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Abstract: *This study aimed at exploring how selected factors of disease control, credit, market infrastructure, and skills development affect the development of the indigenous poultry production value chain in Kathiani Sub-County.The value chain approach embraces the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use. Traditionally extension agents have concentrated their efforts on innovation transfer that targeted production aspects of a poultry and ignored other factors of the value chain. Most farmers specialize in production and may be excluded from decision making about issues that affect them outside their farms. There exists a knowledge gap of what potential there is for income generation and employment creation in the indigenous poultry value chain. Despite their hard work,poultry farmers continue to have low incomes resulting into low living standards. The study employed a descriptive survey research design. The target population consisted of 35 farmers, 5 Agrovet attendants, 5 local poultry traders, and 5 Field Extension Officers. Simple random sampling was used to select 35 farmers who participated in the study.Using purposive sampling method 5 Agrovets, 5 poultry traders and5 extension officers. Data was collected using structured questionnaires and analyzed using frequencies, means and multiple regression at p = 0.05. Results from the study indicated that reconstitution of the Newcastle vaccine and market access had statistically significant effects on the development of the indigenous poultry value chain in Kathiani Sub County. In addition, market facilities for slaughter, cold storage and dedicated sell outlets for table birds were completely lacking in all the major market centers in the study area.*

Extension agents should embrace the value chain approach and provide information on marketing. Local authorities in consultation with relevant technical departments to invest in market infrastructure at fresh produce markets that will enhance sales of table birds and other poultry products. The researcher made several recommendations which include the farmers should be educated more by extension service providers on how to reconstitute the NCD vaccine. The thermal stable NCD vaccine should be made available in the rural areas where electricity is not available. Likewise, There is need to investigate to what extent Common Interest Groups (CIGs) on commercialization of indigenous poultry are a driver in the development of the indigenous poultry value chain in Kathiani Sub County.

Key Words: *Indigenous Poultry Value Chain, Disease control, Credit accessibility, Market infrastructure and Skills development.*

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I. Introduction

Indigenous breeds make up 63% of the world's poultry population. In Europe 52% of the poultry is indigenous, while in Africa indigenous poultry account for 80% (Gueye, 2008). In a large number of low income countries, local chicken production is the largest system of poultry production and a critical source of income and nutrition for poor households. Even in countries with a relatively large modern industrial poultry production sector, India for example free ranging chicken running around in backyards of rural households are a common sight especially in areas with high incidences of poverty and account for a very large proportion of the national poultry population. Ahuja and Sen (2007) provide some figures on the approximate proportion of total poultry population made up by birds kept under small-scale family production systems in selected African countries. Royal Tropical Institute (KIT) and International Institute of Rural Reconstruction (IIRR), (2008) suggest that developing the indigenous chicken value chain can lead to improved livelihoods of people on the African Continent.

In Kenya out of 31.8 million chickens kept, local chicken account for 81% (25.7 million) and 20% (6.1 million) are exotic chicken (Kenya National Bureau of Statistics, 2010). Local poultry production is an integral part of the farming systems in Eastern part of Kenya and represents almost the total poultry flock in the region, with each household keeping between 10-20 birds. Former Eastern Province has a population of 4,404,328 chicken out of which 94.1% (4,144,351) are local and 5.9 %(259,977) are exotic. This trend is

reflected in Machakos where the local chickens account for 92.8% (200,210) of a total flock of (214,578) while 7.2 % (15,368) are exotic chicken (KNBS, 2010). These birds are raised mostly under scavenging free range systems with minimum resource inputs. The productivity of these chickens and utilization (sales and consumption) of meat and eggs within households is generally low. The average annual egg production ranges from 36 to 97 eggs per hen, with a very small egg size of about 46g compared to a potential of 140 eggs per annum with an egg size of 60g (Okitoi, 2007).

The indigenous chicken sector has the potential of contributing to family income considering the existing popularity, suitability to the local conditions, low cost investment, quick returns on investment and their potential for growth in business and business development services. Indigenous poultry is a suitable enterprise where land is limiting. Indigenous chicken are kept for various reasons, including cultural ceremonies which vary from one culture to another. Virtually every household keeps some indigenous chicken (Director Livestock Production, 2008). The population increase in Kenya is about one million people per year (Kenya National Bureau of Statistics, 2010).

There's an increasing demand for white meat in the urban areas, this demand is not in tandem with the supply from the rural areas where most of the local chicken are reared (Ministry of Agriculture, 2008). Consumption is shifting from basic food stuffs to fruits, vegetables, and white meats especially in urban areas (Tropical Royal Institute KIT, FaidaMaLi and International Institute of Rural Reconstruction, 2006). Food markets have changed over time from supply chains to value chains. Food value chains in the developed world are very advanced, consumers demand for high quality products as well as traceability requirements.

In Africa the food value chains are rapidly changing. The high requirements in terms of investment, technology and business skills suggest that small and remote farmers will be excluded from such markets. Nevertheless there are opportunities for small producers and traders who can organize themselves effectively to meet these demanding standards. This poses a new challenge as well as new opportunities for Kenyan indigenous poultry keepers. The question is, how can they upgrade their products and activities so that they can meet these demands? Okitoi (2007) and Wachira (2003) have reported that the productivity of indigenous chicken can greatly be increased. Poultry diseases, notably Newcastle Disease (NCD), are a major cause of high chicken mortality. NCD can only be controlled through vaccination. The vaccine is handled through a cold chain and this is a challenge in the rural areas where cold storage is not available. Affordability and administration of the vaccine also limits its usage among small scale poultry keepers. The NCD vaccine is packaged in large doses while the farmers keep few birds. Access and type of credit contribute to the extent one engages in the poultry business. Requirement of collateral may lock out potential farmers especially those without tangible assets especially women. Credit may also be used to offset other household needs such as school fees.

Market infrastructure is important for any enterprise to flourish, this includes transportation, processing facilities packaging, and selling outlets. Market availability encourages the producer to produce for the market and not just market what they have produced. Consumption is determined by other factors apart from the purchasing power of the consumer. The product should be available in the desired form and quantity. Consumers should be able to buy preferred chicken parts as opposed to whole birds.

Technologies developed for improvement of poultry often are geared towards large commercial exotic flocks in confinement (layers and broilers). The value chain approach has been used in mainly crop based enterprises and not much in livestock production systems. Kaplinsky (2000) defines the value chain as "the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use". Poultry value chains describe the processes through which birds and other inputs pass during the production processes, including information on the place each process occurs and on the people involved. Understanding the poultry value chain, is a starting point for understanding how small-scale poultry development can contribute to household income and well-being.

Despite efforts made by various agents, especially Ministry of Livestock Development (MOLD) and NGOs to promote indigenous chicken industry through provision of information and skills development, the levels of commercialization of the enterprise are low. Information on the value chain in terms of potential for income and employment generation is generally lacking. Extension agents need to view the whole value chain as they advise farmers and other stakeholders. Analysis of the indigenous poultry value chain will identify obstacles that hinder its development and possible solutions to mitigate the constraints. In Machakos, the indigenous poultry value chain maybe one that links a farmer with their friends in the village who occasionally buy a bird or few eggs from them in a week. The value chain might be shorter but despite the status there is a greater need to understand this value chain by interrogating selected factors that affect its development.

II. Materials and Methods

Description of the Study Area

Kathiani Sub County borders these constituencies, namelyKangundoto the North-East, Machakos Town to the South, Mavoko to the West and Mwala to the East.The main socio-economic activities in the area are farming especially poultry and livestock.The constituency has a great potential poultry farmers who rear both indigenous and exotic type of chicken. It also receives an average annual rainfall of between 200-800mm per annum.

Data Collection

This study used a descriptive survey which relied on set of structured and standardized questions administered through the use of questionnaires to collect data from indigenous chicken farmers, chicken traders, agrovets, and field extension officers to establish the bottlenecks to growth of poultry value chain. The purpose of the descriptive research is that it determines and reports the way things are. It involves assessing attitudes or opinions and thoughts about a phenomenon(Kothari, 2004). Thus, the design was appropriate for the study in order to establish the long term and causal dynamic relationships between the variables under the study.A random sampling was used to select CIGs from lists of local poultry provided by the DLPO Kathiani. The study selected Five CIGs that were formed from the year 2011 to 2013. It used proportions to select a total of 20 members from the selected 5 CIGs. Structured questionnaireswere administered as the main tool for data collection in this research. During the survey, interviewer met the farmers in their respective farms after making appointments through the Divisional Livestock Extension Officers.

Data Analysis

Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data was then coded to enable the responses to be grouped into various categories. A descriptive analysis was employed. The analysis of the data was executed using excel and the information presented in form of tables, frequencies and percentages.

III. Results And Discussion

Respondents' characteristics

The researcher was interested in the distribution of respondents by gender, age, marital status and their level of education.The findings are shown in table 1 below. The results indicate that majority of the respondents (70%) were female while 30% were male. Those who were married were a majority at 72.8%, singles 4.9% and a substantial 19.4% widows. Widowers and divorced were 1.9% and 1.0% respectively. Respondents with secondary level of education were 45.6%, primary 41.7%, tertiary 9.7%, and no education were 1%.

Table 1: Demographic characteristics

Item	Frequency	Percentage
Gender: Male	10	30
Female	25	70
Age: 21-30	4	11.6
31-40	7	21.4
41-50	7	19.4
Above 50	17	47.6
Marital status: Married	24	72.8
Single	2	4.9
Widow	7	19.4
Widower	1	1.9
Divorced	1	1.9
Level of Education: Primary	15	41.7
Secondary	16	45.6
Tertiary	7	9.7
Adult Education	1	1.9
None	1	1.9
Total	35	100%

Socio-economic characteristics

The researcher attempted to establish whether socio-economic characteristics affected PIVC at Kathiani Sub County. This is evident from table 2. Annual income from eggs ranged from zero Kenya shillings to 4000 with a mean of 626 and a standard deviation of 753 while income from chicken ranged between zero Kenya shillings to 15000, with a mean of 15,937 and a standard deviation of 28291. Total annual income was between zero and 15000 with a mean of 16, 563 and a total standard deviation of 29044. Number of local chicken kept at the time of survey was a mean of 25 birds per household with a standard deviation of 18. This flock size compares well with the study carried out by Tobias *et al.,* (2011) where the mean was 23.9 birds per

household. In this study flock size ranged from 7 to 43 birds per household. This range was higher than that reported in a study in South Nyanza (Kenya) in an extensive management system (Olwande*et al*, 2010). In that study the flock size ranged from 15 to 19. This could be explained by fluctuation in chicken population due to seasons and time and also the fact that some farmers were practicing semi-confined and confined systems of production which always have a high carrying capacity than extensive system. Income was cited as the main purpose of keeping local chicken by 66.0% of the respondents while those who kept mainly for food were 34.0%. Kaudia and Katalyi, (2000) in a study in Nyando District (Kenya) documented the purpose for keeping indigenous chicken for income as 39.4% and for food as 36.2%. The percentage of farmers who reared the chicken for mainly food compares well with what this study found.

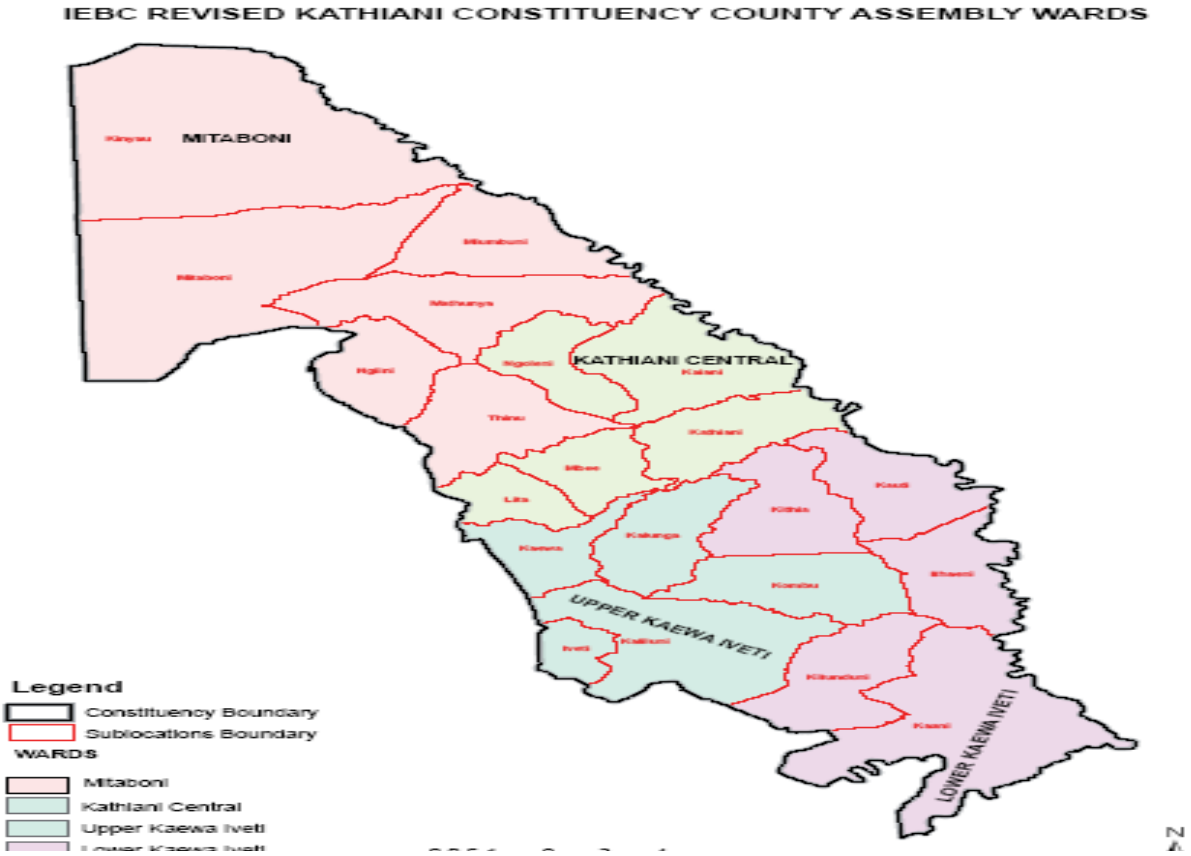

Figure 1: Map of Kathiani Subcounty

Source: Government of KenyaSite

Table 2: Socio-Economic Characteristics

Income	Income	Mean	Std. Dev.	t-value	p-value
Income from eggs (Ksh)	0-4000	626	753	0.569	0.570
Income from chicken (Ksh)	0-15000	15937	28291	0.005	0.996
TOTALS		16563	29044	0.574	1.566

Figure 2: Indigenous poultry value chain in Kathiani Sub County

Control of Newcastle Disease

The first objective was to determine how control of NCD affects the growth of the indigenous poultry value chain in Kathiani Sub County. The least average income was for those farmers who reported that the vaccine was never available; this implied that they did not vaccinate their birds. Table 3 shows the responses, average income and the standard deviations. The findings as recorded by the researcher show that 24 of the farmers indicated that the vaccine was irregular and that the costs were high but affordable. The mean income for these farmers was Ksh 15625 while the standard deviation was 22586. The least number of farmers was 5 and they unanimously indicated that the availability of the vaccine was both regular and irregular. The cost of the vaccine was low and fair. The mean income for these farmers was Ksh 21008 while the standard deviation was 46,482. The last category of farmers have never experienced any availability of vaccine. This is probably because the cost was high and out of reach. The farmers were 6 in number. The mean income of the farmers was Ksh 2250 while the standard deviation was 1414.

Table 3: Control of Newcastle Disease

Availability of Vaccine	Cost of Vaccine	Reconstitution of Vaccine	No of Farmers	Mean Income (ksh)	Std Deviation
Regular/ Irregular	Low/Fair	Yes	5	21,008	46,482
Irregular	High/Fair	No	24	15,625	22,586
Never	Fair/ out of reach	No	6	2,250	1,414

Access and Type of Credit

The second objective was to establish how access and type of credit affects the growth of the indigenous poultry value chain in Kathiani Sub County. The respondents were asked to list the available credit facilities in the study area. This was to indicate whether they were awareof the existence of the facilities in their area. They were to state whether collateral was required or not, and how much credit they would take to expand their indigenous poultry enterprise. Eight credit facilities were mentioned as available in the study area. Table banking was most popular because the service was available at village level. Lending to members was at 10% interest and 20% for none members, all borrowers had to be guaranteed by members. Interest was on a monthly basis. Kenya Women Finance Trust (KWFT) is located at Kathiani town and finances individual women and women groups for business ventures. Most organizations gave loans for varied purposes and collateral was negotiated. This kind of flexibility seems to be gaining popularity in the banking sector. The results are shown in table 4 below.

Table 4: Credit Facilities in Kathiani Sub County as Listed by the Farmers

Name of Organization	Type of Loan	Collateral Required	Interest Rate (%) Charged
Table Banking	Various	YES	10% per Month
Merry-go-round	Various	YES	8-14% per year
Equity Bank	Various	YES	8% per month
KWFT	Various	YES	15% per month
AFC	Various	YES	15% per year
Youth and Women Fund	Various	YES	10% per year

Market Infrastructure

The traders sold on average 65 birds per week and none stocked eggs. They all operated from makeshift shades at the market places and had to hire rooms to keep the left over birds at night or carry them home. The traders sold only live birds due to lack of slaughter and other facilities at the market centers. The marketing of live birds promotes the spread of NCD (Mckenzei, 2005). Kathiani town has a built fresh produce market and has no provision for sell of chicken. Another fresh produce market in Mitaboni was under construction but no provision had been made for sale of chicken whether live or dressed. It was not possible to establish at the time of this study which stakeholders were involved and if some of the infrastructure had been proposed in the design of these fresh produce markets. Lack of market infrastructure hinders the development of the local poultry chain (Emuruon, *et al*, 2008).Poultry traders on the markets in the study area reported lack of facilities; they operated from under tree shades and temporary structures. There were no permanent traders at all other neighboring markets. The details are in Table 5.

Table 5: Market Infrastructure

Name of Market	**No. of Traders**	**Slaughter**	**Processing**	**Market Facilities Cold Storage**	**Store for Live Birds**	**Dedicated Sell Outlets**
Kathiani	14	None	None	None	None	None
Mitaboni	10	None	None	None	None	None
Kaewa	7	None	None	None	None	None
Mbee	4	None	none	None	None	None

IV. Conclusion

The findings showed that; Control of NCD was not sufficiently done due to lack of knowledge and skills by the farmers to handle the vaccine. The existing credit facilities had not been used to the maximum for the development of the indigenous poultry value chain. Local poultry traders operated in difficult conditions and could not invest in value addition. The opportunities in marketing of indigenous poultry were unexploited despite the popularity of indigenous chicken in and away from Kathiani Sub County.

i. On answering the research questions, here forth, on whether access to extension services influenced IPVC, the researcher hereby directs that most of the farmers have limited or no access to extension services.
ii. On answering the research question on whether market infrastructure affect the growth of the indigenous poultry value chain in Kathiani Sub-County, it was found that the region lacks the critical infrastructure to address the growth of IPVC. This therefore calls for the county government to fix the situation around Kathiani Sub County for growth of ipvc to be realized,
iii. On answering the question on whether access and type of credit affect the growth of the indigenous poultry value chain in Kathiani Sub-County had mixed reactions and opinions from the responds as majority of the farmers indicated that they easily got loans from selected microfinance institutions without much conditions. Only a minority percentage indicated that they had a challenge accessing credit.
iv. Finally, on answering the question of whether or not control of NCD affect the growth of the indigenous poultry value chain in Kathiani Sub-County proved correct because many farmers indicated that the Newcastle disease was a major threat towards growth of IPCV but since the control had been boosted, therefore the vaccine had helped them towards growing and developing IPVC.

Conflict of Interests

The authors have not declared any conflict of interest.

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